

# NASA TECH BRIEF



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## Strippable Grid Facilitates Removal of Grid-Surfaced Conical Workpiece from Die



SHEET METAL WITH RAISED DIAMOND PATTERN

### The problem:

To facilitate removal of a sheet metal structure from a die used for explosive forming of the structure. The completed structure is to be a one-piece, open-ended conical frustum with a raised diamond or square grid pattern on its exterior surface. An expensive die with at least five removable segments has been previously required to enable release of the explosive-formed structure from the die.

### The solution:

Use a female die consisting of a smooth conical frustum made of fiberglass with a cured epoxy-resin surface on which a molded grid pattern made of a polyurethane resin is overlaid.

### How it's done:

A smooth male plaster mold conforming to the dimensions of the desired conical frustum is prepared. Fiberglass cloth is then laid up on the mold and an

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epoxy resin is cast over the fiberglass surface. After curing the epoxy resin, the plaster mold is slipped out, leaving a smooth surfaced female die which has the shape of the frustum.

A grid mold is machined from flat metal plate with end mills to provide the grid design. Polyurethane resin is poured into the grid mold cavities and peeled out after curing. The cured grid lacings are then laid up on the smooth surfaced female die and the pre-formed conical sheet metal workpiece is inserted over the grid lacings. The assembly is then subjected to explosive forming. After forming, the completed grid-surfaced sheet metal structure with the adhering polyurethane grid lacings is easily removed from the smooth epoxy resin coated fiberglass die. The grid lacings can readily be peeled from the completed structure and used for additional explosive forming operations.

**Note:**

Inquiries concerning this innovation may be directed to:

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**Patent status:**

No patent action is contemplated by NASA.

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